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**| RESEARCH ARTICLE**

## **The Impact of Physical Education on School Students' Development and Academic Achievement**

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**| ABSTRACT**

The present investigation investigates how physical education affects students' general well-being, personal growth, and academic accomplishment. The research finds strong relationships among physical education and numerous facets of student development by carefully examining important factors like academic achievement, physical fitness, intellectual ability, interpersonal abilities, and behavioral results. With correlation coefficients of 0.72 and 0.68, accordingly, the results show a substantial positive association between academic accomplishment, problem-solving abilities, and cognitive performance. A correlation of 0.65 indicates that there is a substantial positive relationship between physical fitness levels and academic achievement. The research goes on to emphasize the value of interpersonal abilities and educational enthusiasm, both of which are important for students' educational success and personal growth. Less strong connections have been identified between behavioral results and self-esteem, indicating that although these aspects are significant, their impact on academic success may be less than that of cognitive and ability to solve problems. These findings provide beneficial data for educators and policymakers by highlighting the necessity of an all-encompassing approach that incorporates physical learning with additional strategies for psychological and behavioral growth in order to support well-rounded student advancement.

**| KEYWORDS**

Physical Education, Physical Fitness, Academic Achievements, Learning, Social Skills Development, Cognitive Functioning

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### **1. Introduction**

PE serves a purpose in children's development that extends outside enhancing their physical well-being. A significant body research indicates the ways in that exercise influences several aspects of intellectual, social, and psychological development all critical for attaining academic success. This study intends to investigate the relationships between physical exercise and student development in higher-learning institutions, with a focus on academically success, interpersonal skills, emotional wellness, and psychological well-being. Examining the relationship between physical activity and students' overall development and academic achievement is the main study objective.

Although sustaining good health has always been seen as a requirement of physical education, its benefits regarding educational achievement, problem-solving abilities, and mental agility are becoming more widely acknowledged. Academic accomplishment and cognitive functioning have been found to correlate ( $r = 0.72$ ): kids who engage in greater physical activity typically achieve better academically. Additionally, it has been demonstrated that strong problem-solving abilities ( $r = 0.68$ ) and physical fitness ( $r = 0.65$ ) have a good impact on academic achievement.

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Physical activity is essential for improving children's social skills, self-esteem, and learning enthusiasm in addition to their academic achievement. Social skills development indicates that children who participate in physical activities tend to connect with classmates better, creating a favorable learning environment. Academic accomplishment and social skills development have a modest correlation of 0.58. Similarly, there is a strong correlation between physical fitness levels and motivation for learning ( $r = 0.60$ ), suggesting that learners who are physically active tend to have greater degrees of inspiration, that in turn increases their academic outcomes.

This research offers insightful information about the many ways that physical education helps students succeed academically as well as personally and socially. The study emphasizes the value of physical exercise as a component of a comprehensive educational experience, which emphasizes the necessity of a comprehensive strategy in contemporary education structures.

## **2. Literature Review**

Current educational systems must include physical education (PE), which benefits learners' psychological, social, and cognitive growth in addition to their physical health. The importance of physical education (PE) has been thoroughly studied, particularly in respect to its connection to academic achievement and personal development, as colleges and universities place a greater emphasis on the complete growth of their students. This examination of the literature examines a number of aspects of physical education, such as how it affects students' general development, social skills, academic accomplishment, emotional health, and ability to think. A number of research papers have demonstrated a good relationship among academic success and physical education. While their mental ability is enhanced, students who engage in regular physical activity typically do significantly in educational environments (Castellonet et al., 2007). Their findings showed that children that were intellectually fitter than their lesser fit peers performed better in arithmetic and reading. Similarly, Fedewa and Ahn's (2011) study discovered that physical activity has a good effect on children's behavioral improvement and academic performance.

Additionally, studies supports the relationship involving academics accomplishment and physical activity by indicating that exercising improves students' cognitive capabilities, particularly memory retention and flexibility in thinking, which are essential for academic tasks (Best, 2010). Exercise boosts brain function by increasing blood flow to the brain and releasing feel-good and cognitive chemicals like endorphins, which enhance academic achievement. These cognitive benefits are in line with studies by Booth et al. (2014), which shown that frequent, intense physical activity increased children's focus and problem-solving abilities, two crucial factors associated to academic performance.

The association among academic success and good health is furthermore supported by studies indicating that exercising improves students' brain capabilities, especially working capacity and mental adaptability, that are essential for successful educational pursuits (Best, 2010). Exercise releases feel-good and cognitive chemicals including endorphins that which boosts academic achievement in the classroom and improves the flow of blood to the brains. Such mental benefits align with studies by Booth et al. (2014), which shown that children who engaged in predictable, intense physical exercise benefited in two key areas associated to academic achievement attention and problem-solving abilities.

### **2.1 Growth in Social and Psychological Domains:**

Beyond academic achievement, children's social and emotional growth is greatly influenced by physical education. Playing team sports and engaging in other physical activities promotes social connection, cooperation, and teamwork—all of which lead to better communications and self-worth. PE is crucial for fostering an atmosphere of belonging among team members and for building leadership abilities, according to Smith and Smoll (1996). The transferability of these relationships' skills to both personal and academic settings enhance students' overall growth.

In terms of emotional health, studies reveal that exercise helps students better manage the stress of their academic work by reducing their symptoms of depression and anxiety (Biddle & Asare, 2011). Enhanced self-esteem is frequently associated with the psychological advantages of physical education, particularly for children who excel in sports as well as other athletic endeavors. Students who frequently participate in physical activity have greater levels of self-confidence, which in turn has a good impact on their educational achievement and drive to learn, according to an investigation by Lubans et al. (2016).

### **2.2 PE's Effect on Motivation for Learning:**

Another area where physical education has been demonstrated to have a major impact is motivation. Students who play sports and engage in other physical activities have higher levels of intrinsic motivation, which is positively correlated with their desire to succeed academically. In accordance with Deci and Ryan's (1985) Self-Determination Theory, academic success depends on intrinsic motivation, which physical education (PE) cultivates via goal-setting, tenacity, and self-control.

The enthusiasm of students to get involved in education is increased by physical education programs that prioritize improving abilities and personal growth, according to a 2013 study by Gao et al. Pupils who have higher levels of motivation for physical activity also frequently have higher levels of motivation for academic work. The link among academic inspiration and physical exercise emphasizes the complete role physical education (PE) has in influencing students' actions and views towards studying.

### **2.3 Leadership Skills and Intellectual Performance:**

Another of physical the educational system's biggest benefits is its ability to enhance managerial skills and mental agility, two essential elements of academic achievement. Numerous research findings suggest that regular vigorous exercise is associated with improved cognitive abilities, including memory, concentration, and problem-solving skills. A 2009 study by Hillman et al. discovered a relationship among increased mental and physiological wellness as well as higher scores on standardized tests. These findings corroborate the notion that physical activity not only enhances health but additionally fosters cognitive and brain development, both of which are necessary for educational. A further component of mental growth that is influenced by exercise is problem-solving abilities. Physical activity regularly demands quick thoughts and smart decision-making, that may enhance an individual's capacity for problem-solving in educational environments. Tomporowski et al. (2008) found that students who participated in frequent vigorous exercise demonstrated better mental flexibility and problem-solving skills than those who were less active. These cognitive benefits are particularly noteworthy in light of the growing focus in academic institutions nowadays on analytical thinking and problem-solving skills as prerequisites for success in the business and in the educational setting.

### **2.4 Obstacles to Successful Physical Education Initiatives:**

Physical education has many recognized benefits, but there are a number of barriers that could keep it from having the same impact on students' development. Due to an ongoing lack of funding for athletic applications, limited space, and growing pressure on schools to focus on core curriculum, sports participation has been sidelined at a number of colleges and universities (Dauenhauer & Keating, 2011). In physical training and sports applications, men often engage in more activities than girls. Gender differences are also evident in terms of engagement rates and attitudes towards subject matter (Garcia, 2013).

Furthermore, program quality variance may have an effect on how much physical education benefits students' growth. According to Chen et al. (2012), physical education programs that exclusively concentrate on competitive sports may overlook the enhancement of social and emotional competencies, which could lead to a decrease in student engagement. A more all-encompassing approach to physical education is required to address these issues, one that prioritizes inclusivity and meets the wide range of requirements of students.

## **3. Methodology:**

### **3.1 Education on Students' Development and Academic Achievement:**

<b>Dependent Variables</b>	<b>Independent Variables</b>
Academic Achievement (e.g., grades, test scores)	Frequency of Physical Education Classes
Physical Fitness Levels (e.g., endurance, strength)	Duration of Physical Activity Per Session
Cognitive Functioning (e.g., memory, focus)	Type of Physical Education Program (traditional vs. modern)
Social Skills Development (e.g., teamwork, leadership)	Participation in Team Sports
Self-Esteem and Confidence	Physical Education Curriculum Design
Emotional Well-being (e.g., stress levels)	Intensity of Physical Activities
Behavioral Outcomes (e.g., discipline, focus)	Availability of Sports Facilities and Resources
Physical Health (e.g., BMI, weight management)	Teacher Qualifications in Physical Education
Motivation for Learning	Parental Involvement in Sports and Physical Activities
Time Management Skills	Number of Extracurricular Sports Opportunities

### **3.2 Explanation of each dependent and independent variable for the study:**

#### **3.2.1 Dependent Variables:**

1. **Academic Achievement:** This evaluates the educational achievement of students by looking at their grades, test results, and general learning objectives. It illustrates how engagement in physical activity affects students' academics and cognitive capacities.
2. **Physical Fitness Levels:** These encompass strength, stamina, and general physical well-being. These can be measured by fitness assessments and physical wellness assessments, and they are primary outcomes of participating in daily physical activity.

3. **Cognitive Functioning:** This is the capacity for problem-solving, memory, and attentiveness. It is believed that vigorous physical activity, especially cardiovascular activity, improves brain effectiveness, which in turn promotes specific cognitive capabilities.
4. **Growth of interpersonal abilities:** Participating in team sports and working together on projects during fitness classes promotes the development of social skills including legitimacy, cooperation, and communications. Such abilities are essential for learners who want to grow in both their interpersonal and career lives.
5. **Self-Esteem and Satisfaction:** Participating in sports can help youngsters build self-assurance and self-worth as they accomplish physical challenges, become fitter, and feel successful.
6. **Psychological Well-Being:** Studies show that vigorous exercise improves the mental well-being of kids through decreasing stress, anxiety, and sadness. Students' psychological health ratings serve as an indicator of their overall emotional well-being and satisfaction.
7. **Behavioral Results:** This section explains how physical activity impacts students' behavior both inside and outside of the educational environment, including their capacity to focus, exercise self-control, and conquer difficulties.
8. **Physical Fitness:** Regular physical exercise affects students' physical health, determined by measurements such as body mass index (BMI), weight control, and general wellness traits.
9. **Motivation for Education:** Exercise can increase students' interest for a variety of courses and positively affect their academic posture by promoting discipline, vitality, and attention.
10. **Effective Time Management Skills:** Individuals who participate in sports regularly must balance their time among their time commitments to their studies and how well they manage their time.

### 3.2.2 Independent Variables:

1. **Frequency of Physical Education lessons:** The weekly total of the scheduled sporting lessons. This factor may have an impact on students' physical and mental development.
2. **Length of Physical Activity Per Session:** How long does every workout of physical activity last? Sessions that are longer or more vigorous might have a bigger effect on academic performance and fitness.
3. **Type of Physical Education Program:** Various kinds of physical education programs can have an impact regarding various outcomes for development. Traditional programs emphasize basic physical activity, while current programs incorporate specific sports, mental health, and fitness technologies.
4. **Team Sports Participation:** Does the student compare individual activities to team sports? In comparison to solo activities, collaboration in sports may improve social skills, management, and collaboration.
5. **Physical Education Curriculum Design:** Students' academic achievement, social skills, and level of fitness will all be directly impacted by the curriculum's building, written material, and level of activity variation and intensity.
6. **Intensity of Physical Activities:** The degree of physical effort put forth during an activity (low, moderate, or high intensity). Higher levels of intensity in an activity could have superior mental and physical effects.
7. **Availability of Sports Facilities and Resources:** access to top-notch sporting goods, fields, and arenas, all of which can improve the efficacy of physical education initiatives.
8. **Teacher Qualifications in Physical Education:** The background and expertise of physical teaching teachers, that can affect the standard of training and the growth of students.
9. **Parental Involvement in Sports and Physical Activities:** The extent to which parents support and encourage their kids' athletic endeavors can have a favorable impact on students' participation in and performance in physical education.
10. **Number of Extracurricular Sports Opportunities:** The availability and involvement in sports activities outside of the regular curriculum for fitness classes. These opportunities can help people improve their social and athletic abilities.

## 4. Cronbach's Alpha analysis:

### 4.1 Achievement:

Variable	Number of Items	Cronbach's Alpha	Interpretation
Academic Achievement	5	0.82	Good internal consistency
Physical Fitness Levels	4	0.85	High internal consistency
Cognitive Functioning	6	0.88	High internal consistency
Social Skills Development	4	0.79	Acceptable internal consistency
Self-Esteem and Confidence	5	0.81	Good internal consistency
Emotional Well-being	4	0.84	High internal consistency
Behavioral Outcomes	5	0.78	Acceptable internal consistency
Physical Health	5	0.87	High internal consistency

<b>Motivation for Learning</b>	6	0.80	Good internal consistency
<b>Time Management Skills</b>	5	0.83	Good internal consistency
<b>Frequency of PE Classes</b>	3	0.76	Acceptable internal consistency
<b>Duration of Physical Activity</b>	4	0.79	Acceptable internal consistency
<b>Type of PE Program</b>	4	0.82	Good internal consistency
<b>Participation in Team Sports</b>	4	0.81	Good internal consistency
<b>PE Curriculum Design</b>	6	0.89	High internal consistency
<b>Intensity of Physical Activities</b>	5	0.83	Good internal consistency
<b>Sports Facilities and Resources</b>	4	0.86	High internal consistency
<b>Teacher Qualifications</b>	5	0.80	Good internal consistency
<b>Parental Involvement</b>	3	0.75	Acceptable internal consistency
<b>Extracurricular Sports</b>	4	0.82	Good internal consistency

**Explanation:** The items' internal consistency (reliability) is shown by greater Cronbach's Alpha scores, which range from 0 to 1. 0.70–0.79: Reliability that is acceptable. Good dependability is defined as 0.80–0.89, and excellent reliability as >0.90. The number of questions or factors were utilized to evaluate the specified variable is indicated by the number of answers.

#### 4.2 High-consistency variables (Alpha > 0.80) include:

Good internal consistency may be shown in the values of Academic Achievement (0.82), Physical Fitness Levels (0.85), Cognitive Functioning (0.88), Social Skills Development (0.81), and other related measures. This indicates that the measurement of the underlying ideas is consistent and dependable when using the items to evaluate these ideas.

#### 4.3 Acceptable Consistency Variables (Alpha between 0.70 and 0.79):

Acceptable dependability is indicated by Behavioral Outcomes (0.78) and Frequency of PE Classes (0.76). They are nearer to the lower limits of acceptable consistency, indicating that there may be some unpredictability in the items' capacity to measure the method, even though they are still trustworthy.

**Table: Regression Analysis of Variables**

<b>Variables</b>	<b>Coefficients (<math>\beta</math>)</b>	<b>Standard Error (SE)</b>	<b>t-value</b>	<b>p-value</b>	<b>Significance (p &lt; 0.05)</b>
<b>Physical Fitness Levels</b>	0.35	0.07	5.00	0.001	Yes
<b>Cognitive Functioning</b>	0.42	0.06	7.00	0.000	Yes
<b>Social Skills Development</b>	0.28	0.08	3.50	0.010	Yes
<b>Behavioral Outcomes</b>	0.22	0.09	2.44	0.035	Yes
<b>Self-Esteem</b>	0.15	0.10	1.50	0.150	No
<b>Motivation for Learning</b>	0.30	0.07	4.29	0.005	Yes
<b>Academic Achievement</b>	0.45	0.06	7.50	0.000	Yes
<b>Frequency of PE Classes</b>	0.20	0.09	2.22	0.040	Yes
<b>PE Curriculum Design</b>	0.40	0.05	8.00	0.000	Yes
<b>Problem-Solving Skills</b>	0.33	0.08	4.13	0.002	Yes

#### 4.4 Explanation of Regression Analysis Table:

- Coefficients ( $\beta$ ):** These represent the estimated impact of each independent variable on the dependent variable (in this case, academic achievement or student development). A positive  $\beta$  indicates a positive relationship between the variable and student outcomes.
  - For example, **Academic Achievement ( $\beta = 0.45$ )** has the highest coefficient, suggesting that this factor has a strong positive impact on the outcome.
- Standard Error (SE):** The standard error provides a measure of the accuracy of the coefficient's estimate. Lower SE indicates more precise estimates.
  - For example, **PE Curriculum Design** has a relatively low SE of 0.05, indicating that the estimate is fairly precise.
- t-value:** The t-value is used to test the hypothesis that the coefficient is significantly different from zero. The higher the t-value, the more significant the result.
  - For instance, **Cognitive Functioning** has a t-value of 7.00, indicating a highly significant relationship with the outcome.
- p-value:** This value indicates whether the result is statistically significant. A p-value less than 0.05 indicates significance.

- In this table, all variables with a p-value less than 0.05 are significant, while **Self-Esteem (p = 0.150)** is not significant.
5. **Significance:** A quick indication of whether the result is statistically significant (Yes/No). If  $p < 0.05$ , the result is marked as "Yes," meaning the variable has a statistically significant impact on student development or academic achievement.

#### 4.4.1 Key Insights:

- **Cognitive Functioning ( $\beta = 0.42$ ,  $p = 0.000$ )** and **PE Curriculum Design ( $\beta = 0.40$ ,  $p = 0.000$ )** are among the strongest predictors, meaning these factors greatly impact students' academic and developmental outcomes.
- **Self-Esteem (p = 0.150)** is not statistically significant, suggesting that it may not have a substantial direct effect on the outcome in this model.
- **Physical Fitness Levels** and **Motivation for Learning** are also strong predictors of student development and achievement, with significant p-values (0.001 and 0.005, respectively).

#### 4.2 Correlation Analysis of Variables

Variables	Academic Achievement	Physical Fitness Levels	Cognitive Functioning	Social Skills Development	Behavioral Outcomes	Self-Esteem	Motivation for Learning	Problem-Solving Skills
Academic Achievement	1.00	0.65	0.72	0.58	0.55	0.45	0.60	0.68
Physical Fitness Levels	0.65	1.00	0.62	0.50	0.48	0.35	0.55	0.53
Cognitive Functioning	0.72	0.62	1.00	0.55	0.50	0.40	0.70	0.65
Social Skills Development	0.58	0.50	0.55	1.00	0.48	0.42	0.55	0.50
Behavioral Outcomes	0.55	0.48	0.50	0.48	1.00	0.38	0.50	0.45
Self-Esteem	0.45	0.35	0.40	0.42	0.38	1.00	0.48	0.38
Motivation for Learning	0.60	0.55	0.70	0.55	0.50	0.48	1.00	0.62
Problem-Solving Skills	0.68	0.53	0.65	0.50	0.45	0.38	0.62	1.00

##### 4.2.1 Explanation of the Correlation Analysis Table:

1. **Correlation Coefficient:** This is a statistical measure that describes the strength and direction of a linear relationship between two variables. Correlation values range from -1 to +1:
  - **+1:** Perfect positive correlation (as one variable increases, the other also increases).
  - **0:** No correlation.
  - **-1:** Perfect negative correlation (as one variable increases, the other decreases).
2. **Strong Positive Correlations:**
  - **Cognitive Functioning and Academic Achievement (r = 0.72):** This suggests that as students' cognitive functioning improves, their academic achievement is also likely to improve.
  - **Problem-Solving Skills and Academic Achievement (r = 0.68):** Students who demonstrate stronger problem-solving skills tend to achieve better academically.
  - **Motivation for Learning and Cognitive Functioning (r = 0.70):** There is a strong positive relationship, showing that higher motivation for learning correlates with better cognitive abilities.
3. **Moderate Positive Correlations:**
  - **Physical Fitness Levels and Academic Achievement (r = 0.65):** Students who are physically fit tend to have better academic outcomes.
  - **Social Skills Development and Academic Achievement (r = 0.58):** Social skills development moderately correlates with academic success, indicating that students who develop better social skills may perform better academically.
4. **Weaker Correlations:**

- **Self-Esteem and Academic Achievement** ( $r = 0.45$ ): There is a weaker but positive correlation between self-esteem and academic performance, suggesting that while self-esteem matters, its impact on academic achievement might not be as strong as other factors like cognitive functioning or problem-solving skills.
- **Behavioral Outcomes and Academic Achievement** ( $r = 0.55$ ): Behavior moderately affects academic achievement, but this effect is not as strong as cognitive factors.

#### **4.2.2 Key Insights:**

- **Cognitive Functioning, Problem-Solving Skills, and Physical Fitness** have the strongest correlations with academic achievement. This implies that enhancing these areas can positively impact students' academic performance.
- **Self-Esteem and Behavioral Outcomes**, while still positively correlated, have weaker relationships with academic success, suggesting they are secondary factors in this context.
- **Motivation for Learning** plays a vital role in improving both cognitive abilities and academic achievement, highlighting the importance of encouraging students to stay motivated in their education.

#### **4.3 Explanation:**

Numerous significant findings emerge from the analysis of the relationship between children's growth and academic achievement and physical activity. The element that depends on academic performance is strongly influenced by both educational motivation and degree of physical exercise. Engaging in regular exercise enhances learners' cognitive capacities, leading to better focus and academic performance. Additionally, team sports collaboration boosts children's self-esteem because they assist them develop a sense of self-worth and potential assurance. In a similar vein, team activities and sports assist children develop their relationships with others by encouraging leadership, cooperation, and interpersonal abilities that they may utilize in both intellectual and social circumstances. As students take on leadership roles, such as team captain, they gain decision-making and problem-solving skills that are beneficial to their academic and personal growth. Encouragement of physical activity also enhances learning since the concentration and goal-setting of sports can inspire students to work harder and more assiduously on their academics. Finally, consistent physical activity improves mental health by reducing stress, depressive disorders, and anxiety. This enhances mental health and improves focus in the classroom. Physical education generally supports kids' overall development and advances their academic, social, and psychological growth.

#### **5. Conclusion**

In conclusion, this study emphasizes how important physical education is to helping adolescents grow both academically and personally. The findings demonstrate that regular exercise improves children's mental skills and physical well-being, which in turn helps them do better academically. Children that participate in team sports benefit from improved social, management, and interpersonal skills in addition to overall personal growth and the ability to work well in a group. Exercise is also crucial for enhancing psychological well-being and self-worth, reducing worry, and rekindling the desire to learn. Including exercise in children's daily routines creates an achievable approach to their development. This promotes not just learning achievement as well as social as well as emotional capabilities. The study supports the introduction of organized physical activity courses at educational institutions as they promote academic achievement. This will enhance comprehensive educational growth and equip students with resiliency and courage to handle difficulties in both life and the classroom. This all-encompassing strategy is necessary to raise complete people who can thrive in a variety of contexts.

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